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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,467	06/30/2005	Hidehito Fukuyasu	2271/74749	8934
23432	7590	10/03/2007	EXAMINER	
COOPER & DUNHAM, LLP			GOLDBERG, BRIAN J	
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NEW YORK, NY 10036			2861	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/541,467	FUKUYASU, HIDEHITO	
Examiner	Art Unit		
Brian Goldberg	2861		

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 30 June 2005.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-5 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) Claim(s) _____ is/are allowed.
6) Claim(s) 1,2,4 and 5 is/are rejected.
7) Claim(s) 3 is/are objected to.
8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 30 June 2005 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948) Paper No(s)/Mail Date: ____.
3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 6/30/05. 5) Notice of Informal Patent Application
6) Other: ____.

DETAILED ACTION

Specification.

1. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

Claim Objections

2. Claims 1-5 are objected to because of the following informalities:
 3. Claim 1 recites the limitations "the formula" in line 22 of page 42 and "the overlapping discharge nozzles" in line 15 of page 43. There is insufficient antecedent basis for these limitations in the claim.
 4. Claim 2 recites the limitation "the same printing region" in line 24 of page 43. There is insufficient antecedent basis for this limitation in the claim.
 5. Claim 3 recites the limitations "the number k of repetitions" in line 5 of page 44 and "the interval" in line 6 of page 44. There is insufficient antecedent basis for these limitations in the claim.
 6. Claim 4 recites the limitations "the number of the overlapping discharge nozzles" in line 15 of page 44 and "the number of the invalid nozzles" in lines 16-17 of page 44. There is insufficient antecedent basis for these limitations in the claim.
 7. Claim 5 recites the limitations "the formula" in line 15 of page 45 and "the overlapping discharge nozzles" in line 8 of page 46. There is insufficient antecedent basis for these limitations in the claim.
- Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al. (US 6540326) in view of Bates et al. (US 6318832) and further in view of Couwenhoven et al. (US 6273542).

10. Regarding claims 1 and 5, Matsubara et al. disclose "a head unit (702 of Fig 1) in which a plurality of recording heads (701 of Fig 1) having discharge nozzles (801 of Fig 2) which discharge ink drops of different colors respectively are arranged in a main scanning direction (see Fig 1), and the discharge nozzles of each of the recording heads are arranged at equal intervals in a sub-scanning direction which is perpendicular to the main scanning direction (see Fig 2); a head-unit moving unit (706 of Fig 1) moving the head unit in the main scanning direction along a printing region of a recording medium (see Fig 1); a recording-medium moving unit (705, 703, 704 of Fig 1) moving the recording medium in the sub-scanning direction; and a control unit controlling the head unit, the head-unit moving unit, and the recording-medium moving unit (see Fig 13 for control system)...and configured to repeat the printing procedures k times according to an ink dot density (see Fig 9B, where in this example, it is repeated 2 times), and thereafter move the recording medium in the sub-scanning direction so that the head unit is located to a next non-printed region following the printing region (col 8

In 25-30) and the printing procedures are performed for the next non-printed region (repeat above)."

11. Thus Matsubara et al. meet the claimed invention except "wherein the control unit is configured to carry out printing procedures including steps of moving the recording medium to the printing region to perform the discharging of the ink drops, and moving the recording medium in the sub- scanning direction by an interval represented by the formula H/k where H is an array interval of the discharge nozzles in the sub- scanning direction and k is an integer above one, to perform the discharging of the ink drops to a non-printed region equivalent to the array interval H of the discharge nozzles...wherein the control unit is configured so that a rear-end portion of the discharge nozzles in an array direction after printing of the printing region and a front- end portion of the discharge nozzles in the array direction before printing of the non- printed region overlap each other with respect to the sub-scanning direction, and invalid nozzles that do not discharge the ink drops are determined from among arbitrary ones of the overlapping discharge nozzles including the front-end portion and the rear-end portion in the array direction of the discharge nozzles."

12. Bates et al. teach "wherein the control unit (24 of Fig 2) is configured to carry out printing procedures including steps of moving the recording medium to the printing region to perform the discharging of the ink drops (col 4 In 50-58), and moving the recording medium in the sub-scanning direction by an interval represented by the formula H/k where H is an array interval of the discharge nozzles in the sub-scanning direction and k is an integer above one (see Fig 6, d/2), to perform the discharging of

the ink drops to a non-printed region equivalent to the array interval H of the discharge nozzles (see Fig 6)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to apply the printing steps of Bates et al. where the recording medium is moved by the above interval to improve the printing device of Matsubara et al. for the predictable result of reducing a variation in ink surface density on a recording sheet in a print operation, thereby efficiently increasing the image density, and preventing blurring by promoting absorption and evaporation of an ink to and from a paper sheet, as stated by Bates et al.

13. Further regarding claims 1 and 5, Couwenhoven et al. teach "wherein the control unit is configured so that a rear-end portion of the discharge nozzles in an array direction after printing of the printing region and a front-end portion of the discharge nozzles in the array direction before printing of the non-printed region overlap each other with respect to the sub-scanning direction (see Fig 3 for an example showing three passes with overlap), and invalid nozzles that do not discharge the ink drops are determined from among arbitrary ones of the overlapping discharge nozzles including the front-end portion and the rear-end portion in the array direction of the discharge nozzles (for example, 100 of Fig 3)."

14. Regarding claim 2, Couwenhoven et al. further teach "wherein the control unit is configured to determine as being the invalid nozzles at least one of the discharge nozzles located in the rear-end portion in the array direction upon a final movement of the head unit in the main scanning direction for printing in the same printing region and one of the discharge nozzles located in the front-end portion in the array direction upon

a first movement of the head unit in the main scanning direction for printing in the non-printed region (see Fig 3; the reference uses 100 shown in the figure just as an example of an invalid nozzle, but acknowledges that any of the nozzles could be determined to be invalid, which would include the rear-end portion and front-end portion, see col 5 ln 29-41)."

15. It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to apply the printing operation of Couwenhoven et al., where the printing passes overlap and invalid nozzles are determined, to improve the printing device of Matsubara et al. in view of Bates et al. for the predictable result of compensating for invalid or inoperative ink nozzles, so that high quality images at the desired density are printed although some ink nozzles are invalid or inoperative, as stated by Couwenhoven et al.

16. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al. in view of Bates et al. and Couwenhoven et al. and further in view of Kanaya et al. (US 6170932). Matsubara et al. in view of Bates et al. and Couwenhoven et al. disclose the claimed invention as set forth above regarding claim 1. Thus Matsubara et al. in view of Bates et al. and Couwenhoven et al. meet the claimed invention except "when the number of the overlapping discharge nozzles is increased, the control unit is configured to increase the number of the invalid nozzles."

17. Kanaya et al. teach "when the number of the overlapping discharge nozzles is increased, the control unit is configured to increase the number of the invalid nozzles (see Figs. 14 and 15, where the number of overlapping nozzles increases from Fig. 14

to Fig. 15 and the number of invalid nozzle (represented by dashed lines) increases from 1 to 2)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to apply the printing operation of Kanaya et al., where invalid nozzles increase as overlap increases, to improve the printing device of Matsubara et al. in view of Bates et al. and Couwenhoven et al. for the predictable result of effectively preventing banding and enabling high-quality printing at the desired print density, as stated by Kanaya et al.

18. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Goldberg whose telephone number is 571-272-2728. The examiner can normally be reached on Monday through Friday, 9AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on 571-272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brian Goldberg
AU 2861
September 27, 2007

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Matthew Luu

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SUPERVISORY PATENT EXAMINER